INFORMATION PAPER

CEMP-EA
4 April 1997

SUBJECT: “Hard” vs “Soft” Metric Conversion

1. Purpose. Information for distribution at the 1997 District Commanders' Conference.

2. Facts.

a. Unfortunately, the terms “hard” and “soft” have been introduced into the metric conversion process with multiple interpretations that cause continual confusion. The simplest definitions are that “hard metric” is an actual change in measurements or size of products to new, rational metric dimensions. The “soft metric” means a conversion by calculation where an inch-pound (imperial unit) number is multiplied by a metric conversion factor and expressed in metric value with or without rounding to the appropriate level of precision. Soft metric includes measurements or products that are simply relabeled in metric units with no change in physical size.

b. USACE metric conversion guidance has been closely coordinated with the construction industry. Where the industry has committed to a "hard" metric product and that product is manufactured, only "hard” metric product dimensions are specified and used in the design. Where the industry is yet undecided, inch-pound products are specified with both inch-pound and the mathematically converted "soft metric” value when there are no adverse impacts on the efficiency of the design. The extent of using “hard” and “soft” metric materials should be further evaluated during the design process based on project size, location, total installed costs, and the availability of the materials to be specified (but we should not back off because of unsubstantiated claims of nonavailability).

c. Of the thousands of building products, only a few (known as the modular products), such as brick, concrete masonry units (CMU), recessed lighting fixtures (RLF), ceiling tiles, gypsum wallboard, rigid insulation, etc., need to change in size to avoid unnecessary cutting or trimming because their use require them to “dimensionally coordinate” or fit together into the standard 100 mm metric building module. To date, controversy concerning “hard” vs “soft” metric conversion have been caused by only three manufacturing elements in the industry, i.e., the rebar industry, the recessed lighting fixture manufacturers, and the CMU block manufacturers. In all three cases, the industry had set their own new “hard metric” sizes which required a physical change to their products, a portion of the industry converted and started to produce the metric sizes, a portion of the industry decided not to convert, and then the industry began to argue within itself.

(1) The rebar industry, as represented by the Concrete Reinforcing Steel Institute (CSRI) and the Steel Manufacturers Association (SMA), along with many other entities has worked through the American Society for Testing and Material (ASTM) to develop new

consensus
standards on this subject. The new standards, ASTM A615M-96a and ASTM A706M-96a, based on the soft metric conversion of the inch-pound rebar sizes, were finalized in mid-1996 and since been adopted by all Federal agencies. As far as the Federal Government is concerned, rebar is not

a modular material in that they do not have to fit together into the standard 100 mm metric building module, and we will endorse and use whatever standards adopted by the industry.

(2) The Savings in Construction Act of 1996 (Public Law 104-289) provides specific requirements for CMU and RLF. According to the provisions of this new statute, CMU and RLF shall only be specified in hard metric size in a Federal Construction Project if: the products are necessary to fit together into the 100 mm building module, and the total installed price of hard metric CMU or RLF is estimated to be equal or less than the total installed price of using inch-pound (soft metric) CMU or RLF. Total installed price is the price of purchasing and installing the product, including all cutting and trimming necessary to fit them with other building components in a 100 building module.

(3) To comply with the new Act, a joint Military Program and Civil Works memorandum, subject Metric Design Policy for Specifying Modular Metric Products, dated 13 Dec 1996, was issued. Our policy, which was coordinated with other Federal agencies, the HQUSACE Offices of the Chief Counsel and the Principle Assistant Responsible for Contracting (PARC), is to permit Prime Contractor the use of either hard metric or soft metric CMU and RLF provided all project design requirements are met. This method avoids the necessity of preparing and defending a detailed cost analysis, as required by the law, before specifying CMU and RLF in hard metric sizes only, and allows the final decision to be made by the contractor. The new policy applies to all construction contract awarded and solicitations issued on or after 10 Jan 97.

3. This information paper has been approved by BG Phillip Anderson, Director of Military Programs.

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